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RESEARCH **Open Access**

The Effect of Using Endorphin Massage for Decreasing Pain at First Stage in Normal Labor

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Abstract
Labor pain is a subjective experience of physical sensations associated with uterine contractions, dilation, thinning cervix and fetal descent during labor. To resolve the pain of labor, it has been implemented in a nonpharmacological method which is endorphin massage, in understanding endorphin massage for pressing pain in the first stage, in an active phase of normal multiparous mothers' deliveries. This research aims to research endorphin massage's influence on suppressing pain during the active phase of normal labor of multiparous mothers. This study is quasi-experimental with a cross-sectional approach. The study population of all women giving birth administered the purposive sampling data capture techniques, and it was obtained 132 multiparous mothers with normal labor in the observation sheet. Data were examined by administering a T-test. The majority of the pain intensity in the first stage of active phase multiparous mothers with normal labor, before the breath relaxation, is severe, with up to 49% experiencing severe pain. The majority of the percentage of moderate pain in the first stage of active phase multiparous mothers with normal labor, after breath relaxation, is as high as 42%. Meanwhile, the pain intensity of the first stage in active phase multiparous mothers with normal labor, prior to endorphin massage, is as high as 73.3%. Pain intensity of the first stage in active phase multiparous mothers normal labor after endorphin massage, the majority of the percentage is moderate pain up to 53.3%. Statistical test results obtained p-value is 0.004 endorphin massage. In conclusion, there is an effect of breath relaxation on the intensity of pain during normal labor in multiparous mothers. Furthermore, researchers can do a combination of endorpine massage with other treatments to treat pain during the I active phase of labor and pain intensity checks can be done by testing cortisol levels.

Keywords: Hypertension, Knowledge Level, Lifestyle.

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1. INTRODUCTION

Childbirth and birth are physiological processes that accompany almost every woman. Although physiological processes are generally frightening as they are accompanied by severe pain, frequently even providing rise to life-threatening physical and mental conditions (Al-qerem, 2020). Labor pain is caused by myometrial contractions incorporated by physiological and biochemical change mechanisms (Aminisaman et al., 2020). Furthermore, psychological factors, emotions and motivation also affect the beginning of childbirth (Bintang et al., 2021). Mothers who give birth desire to be free of pain caused by contractions; it should be emphasized to mothers that without pain, childbirth will not progress as one of the signs of childbirth is painful contractions (Bruton, 2008).

Physical and psychological barriers in the mother during childbirth may also contribute to the pain (Neige et al., 2020). The most exhausting and hard time is when mothers begin to experience pain during the first stage of the active phase. In this phase, most mothers encounter severe pain as the activities of the uterus begin to be more active (Hong & Shin, 2020). In the contraction phase, the longer it is, the stronger and more frequent it will be (Jarrah et al., 2022).

Various nonpharmacological methods, such as distractions, hypnosis, relaxation, and simulation of cutaneous pain, have been employed to alleviate pain during childbirth (endorphin massages, warm baths and hot compresses) endorphin massage (Liao et al., 2021). Nonpharmacological pain control is cheaper, simpler, effective, and without adverse effects (Cojocaru, & Mârza-Dănilă, 2014). This method can also escalate satisfaction during childbirth as the mother is able to monitor her feelings and fears (Liu et al., 2021).

Relaxation is resting the body and mind from all physical and psychological burdens in becoming calmer (Liu et al., 2021). Furthermore, relaxation can also produce blood circulation in the uterus, placenta and fetus smooth. Hence, oxygen and fetal food are maintained (Fasihi et al., 2022). Smooth blood circulation will also cause the muscles directly related to the uterus to weaken and sag, allowing contractions to occur naturally, smoothly, safely, and more quickly (Meer et al., 2020).

One of the methods of nonpharmacological management is to decrease labor pain with endorphin massage (Nunes et al., 2016). Endorphin massage is a touch therapy/light massage which is crucial to be provided in the time leading up to the labor time (Page et al., 2022). It is because massage stimulates the body to release endorphin compounds as pain relievers and produce a comfortable feeling (Quinlan-Colwell et al., 2022).

According to a preliminary study conducted on ten maternity mothers, six mothers experienced severe pain, three mothers suffered moderate pain, and one mother encountered mild pain. As a result, the mother will experience pain during childbirth. Relaxation and endorphin massage during childbirth are two methods for overcoming it (Apryanti, & Astuti., 2020). This research aims to research endorphin massage's influence on suppressing pain during the active phase of normal labor of multiparous mothers.

2. RESEARCH METHOD

This is a quasi-experimental study with only pretest and posttest control groups. The location where this research was performed. The research was conducted between May and June of 2022. This study included all maternity mothers who fulfilled the inclusion criteria. From January to August, an average of 66 mothers were obtained. In this study, 66 pregnant women will be provided a breath relaxation treatment and a endorphin massage. Maternity mothers numbered 1 to 66 will receive breath relaxation treatment, while those numbered 66 to 132 will receive endorphin massage treatment. This study employs a purposive sampling technique that is associated with a specific balance determined by the researcher utilizing

previously identified population characteristics or traits endorphin massage. The object of research in this study was to match the two groups by establishing several inclusion criteria. In this study, the free variables were breath relaxation techniques and endorphin massage. The presence of free variables affects or results in dependent variables. The bound variable in this study is pain intensity during the first stage of normal labor.

Data collected in this study encompass primary data collected directly by researchers on covering respondents' identities, health issues, and obtaining permission to be respondents. Secondary data is information obtained from the register book of pregnant women. The data in this study were descriptively examined by calculating the minimum, maximum, mean, and standard deviations of the intensity of pain during the first stage of normal labor in the groups provided breath relaxation and the group provided endorphin massage. Bivariate analysis was performed by administering t-test (t-test). This study has obtained ethical permission from Research Ethic Committee (LB.01.01/KEPK/198/2022).

3. RESULTS AND DISCUSSION

Table 1. Respondent Characteristics (n=132).

Characteristics	**Frequency Distribution**	
	Amount	**Percentage**
Age		
<20 Old	7	5%
21-35 Old	112	85%
>35 Old	13	10%
Occupation		
Working Women	32	24%
Housewife	100	76%
Number of children		
1	47	36%
2	54	41%
≥3	31	23%

Table 1 demonstrates that the majority of 112 respondents (85%) possess the aged of 21-35 years, 100 (76%) respondents are working mothers, and 54 (41%) respondents own 2 children.

Table 2. Pain Intensity during the Frist Stage of Normal Labor in the Breath Relaxation Group (n=66).

Pain Intensity	**Pre**		**Post**	
	Frequency	**%**	**Frequency**	**%**
0 (painless)	0	0	12	18%
1- 3 (mild pain)	10	15%	15	23%
4- 6 (moderate pain)	24	36%	28	42%
7-10 (severe pain)	32	49%	11	17%

Table 2 illustrates the intense pain during normal labor before breathing relaxation results which discovered some of the 32 respondents (49%) who possessed severe pain, and the intensity of pain during normal labor after breathing relaxation obtained the results which is most of the 28 respondents (42%) experienced moderate pain.

Table 3. Effect of Breath Relaxation on Pain during the Frist Stage of Normal Labor (n=66).

	Mean	Min	Max	SD	p-value
Pre	7,00	4,00	9,00	1,41	0,001
Post	5,40	3,00	8,00	1,63	

Table 3 illustrates that before the breath relaxation treatment, the intensity of pain during the first normal labor was the lowest at 4.00 and the highest was 9.00, with an average of 7.00 and a standard deviation of 1.41. Meanwhile, after the breath relaxation treatment, the lowest pain intensity was 3.00 and the highest was 8.00, with an average of 5.40 and a standard deviation of 1.63. The difference between the first and second measurements is 1.60 on average, with a standard deviation of 0.63. The sample-related magnitude p-value is 0.00 according to the results of statistical tests by employing the T-test. The magnitude of the $p<0.05$ value demonstrates that there is an effect of breath relaxation on the intensity of pain during normal labor.

Table 4. Pain Intensity during the First Stage of Normal Labor with Endorphin Massage Group (n=66).

Pain Intensity	Pre		Post	
	Frequency	%	Frequency	%
0 (Painless)	4	6%	16	24%
1- 3 (Mild Pain)	11	17%	33	50%
4- 6 (Moderate Pain)	12	18%	12	18%
7-10 (Severe Pain)	39	59%	5	7%

Table 4 presents that pain intensity during the first stage of normal labor before the application of endorphin massage uncovered that some of the 39 respondents (49%) possessed severe pain, and the intensity of pain during normal labor after endorphin massage obtained the most of the 33 respondents (50%) in mild pain.

Table 5. Effect of Breath Relaxation on Pain during the First Stage of Normal Labor (n=66)

	Mean	Min	Max	SD	p-value
Pre	7,00	5,00	9,00	1,00	0,001
Post	3,80	2,00	6,00	1,08	

Table 5 displays that before the application of endorphin massage treatment, the intensity of pain during normal labor was 5.00, 9.00, and 7.00 with a standard deviation of 1.00. Meanwhile, after the application of endorphin massage treatment, the lowest pain intensity was 2.00, the highest was 6.00, and the average was 3.80 with a standard deviation of 1.08. The difference between the first and second measurements is 3.20 on average, with a standard deviation of 0.94. The sample associated with the magnitude of the p-value is 0.00 in accordance with the results of statistical tests with the T-test. The magnitude of the p0.05 value indicates the effect of endorphin massage on pain intensity during normal labor.

Table 6. Differences in Endorphin Massage with Pain Intensity during the First Stage of Normal Multiparous Labor.

Treatment	N	Mean	SD	p-value
Breathing relaxation	15	5,40	1,63	0,004
Endorphin massage	15	3,80	1,08	

Table 6 demonstrates that the average pain intensity during the first stage of normal labor after respiratory relaxation was 5.40 with a standard deviation of 1.63. Meanwhile, the average pain intensity during the first active phase of normal labor of multiparous mothers after

endorphin massage was 3.80, with a standard deviation of 1.08. Statistical tests obtained a p-value of 0.004 in alpha 5%. Large $p<0.05$ values revealed a significant difference in the average pain intensity during first stage normal labor in the breath relaxation group with the endorphin massage group.

In general, maternity mothers experience pain at the time of labor, but the intensity of this pain is different from each maternity mother (fear and attempting to fight the pain of childbirth) as well as the presence or absence of support from people around the labor process (Sangeethalaxmi & Hankey, 2022). Parity also influences the perception of pain (Scuteri et al., 2022). In primipara, it will be more painful at the beginning of labor, while in multiparous, the pain increases when the labor has been advanced (when the labor of the fetus takes place quickly at time II) (Sorel et al., 2022).

Multiparous mothers have given birth to a baby several times (up to 5 times) (Timmers et al., 2021). They experienced pain in previous childbirth, hence, multiparous possesses a mechanism to overcome the pain of childbirth in contrast to primipara (Triansyah et al., 2021). This mother had never given birth and had a child before, and the labor process she has encountered was the first experience causing emotional tension, anxiety and fear that can aggravate the pain (Urio et al., 2019). The intensity of labor pain in primiparous is frequently more severe than in multiparous as it experiences effacement (thinning of the cervix) along with cervical dilatation, while in primipara, effacement used to occur earlier than cervical dilatation (Vilc et al., 2021).

Factors affecting a person's pain encompass physiology, psychological factors, perception factors and pain tolerance (Valente et al., 2020). Physiological (physical) factors incorporate opening, thinning of the cervix, the lower segment of the uterus tensing, peritoneum attracted by the bladder depression, hypoxia, vaginal distress, parity (primiparous/multiparous), then psychological factors encompass fear, panic, low self-esteem, anger, fear, anxiety, and impaired sexual activity (Mulhaeriah et al., 2018). Furthermore, the perception factor which triggers receptors and pain tolerance factors are closely associated with the intensity of pain which is able to affect a person to endure pain and someone who owns previous pain experiences (Fitri et al., 2021).

From the results of the study, it was revealed that the distribution of pain intensity in the breath relaxation group before treatment was in majority the percentage of severe pain 66.7% (10 respondents) and moderate pain 33.3% (5 respondents). After the breath relaxation treatment, most of the percentage was moderate pain 60.0% (9 respondents), severe pain 26.7% (4 respondents) and mild pain 13.3% (2 respondents). Moreover, the distribution of pain intensity in the endorphin massage group before treatment was generally 73.3% severe pain (11 respondents) and moderate pain 26.7% (4 respondents). After the endorphin massage treatment, most of the percentages were moderate pain 53.3% (8 respondents) and mild pain 46.7% (7 respondents).

Pain impulses can be regulated or inhibited by defense mechanisms along the central nervous system (Fitri et al., 2020). Theoretically, low-level activity on small fibers that transmit nonselective data impulses is inhibited and spliced first synapses by the activity of large ascendant fibers, and the activity in the decedent fibers of the higher center is tinkered (Zhu et al., 2021). Intense activity in small fibers triggered by painful stimuli opens the gates in the first disincentive activity in heavy fibers 'closes the gates' against pain stimuli.

An activity balance of sensory neutrons and sensory control fibres of the brain maintains defense processes (Alhafez & Berghella, 2020). Delta-A and C neurons released substance P to transmit impulses through defense mechanisms (Churakov et al., 2021). Furthermore, mechanoreceptors are thicker beta-A neurons faster than they release inhibitory neurotransmitters (Häggsgård et al., 2021). If the dominant input originates from beta-A fibers, it will close the defense mechanism. It is identified that this closure mechanism can be

perceived when the labor companion gently rubs the client's back (Kahrs & Eggebø, 2021). The resulting message will stimulate mechanization, if the dominant input originates from delta A fibers and C fibers, it will open up those defenses, and the client perceives pain sensation pain (Kim et al., 2021).

Even if pain impulses are transferred to the brain, a higher cortex center in the tinker modifies the pain (Li & Zhao, 2021). The decent nerve groove releases endogenous opiate, a natural pain killer originating in the body (López-Fernández et al., 2022). This neuromodulator closes the defense mechanism by inhibiting the suppression of the substance of P. distraction techniques, breath relaxation, endorphin massage, hypnosis and placebo administration. Pain during childbirth is affected by stimuli of adnexa receptors, uterus and pelvic ligaments. Stimulation during one labor is transmitted from the afferent tissue through the lower, middle and upper parts of the hypogastric plexus, lumbar and lower thoracic sympathy chains to the lower nerve root ganglia at T10-L1 (Murphy et al., 2021). Pain can be delivered from the pelvic region to the navel (umbilicus), upper thigh and mid-sacrum region (Raana & Fan, 2020).

Pain during labor is affected by a combination of stretching of the lower segment of the uterus (and subsequently) and ischemia (hypoxia) of the uterine muscles with an increase in the strength of cervix contractions will be attracted (Raana & Fan, 2020). This strong contraction also limits the flow of oxygen in the uterine muscles, hence, ischemic pain arises (Saldanha-Gomes et al., 2022). Pain due to uterine contractions is extensively affected by ischemia in the myometrial fibers because the fibers are more numerous, and the contractions are more robust in the upper segments of the uterus (Shen et al., 2021). The pain is experienced more intensely in stimulated cutaneous T12 and L (Talukder et al., 2021).

In accordance with the results of statistical tests by employing independent t-tests, the results ($p<0.05$) demonstrated that a p-value of 0.000 indicates that breath relaxation owns a significant effect on the intensity of pain during the active phase of normal childbirth of multiparous mothers.

During labor, the muscles on the uterine wall tighten in a tight pulling position with full force to deliver the baby out of the womb (Briozzo et al., 2016). Supposing the mother possesses difficulty in being relaxed or even panics, the muscles throughout the body tightly, hence, the labor process tends to hurt more than it should (Al-qerem, 2020). On the contrary, if the maternity mother is able to relax during the contraction, she will experience comfort during the labor process by employing the right breath relaxation technique, and it will escalate the mother's ability to control her pain and decrease anxiety, lower catecholamine levels, stimulate blood flow to the uterus and decrease muscle tension (Aminisaman et al., 2020). The breath relaxation technique is inhaling through the nose and exhaling through the mouth when the contractions occur (Neige et al., 2020).

The pain intensity when first stage maternity before and after breathing relaxation is generally different (Liao et al., 2021). It is to the theoretical concept demonstrated that breath relaxation is able to reduce the pain experienced by the mother (Jarrah et al., 2022). The mother still experiences contractions in her womb as these contractions are necessary for the progress of childbirth, but the mother should enjoy contractions as something that feels comfortable (Liao et al., 2021).

With the concept that the state of relaxation, comfort, calm, and coordination between the mind and body results in the muscles of labor working in an integrated manner, the muscles of the circle relax and are pulled upwards causing the cervix thins and opens, which eventually occurs and childbirth can occur easily (Bukenya & Golooba-Mutebi, 2020).

According to the findings of statistical tests using the independent t-test, a p-value of 0.000 indicates that massage endorphin significantly affects the intensity of pain during the

first active phase of normal childbirth in multiparous mothers. Nonpharmacological pain control methods are very essential for overcoming pain during childbirth because they do not harm the mother or fetus, do not slow down labor if given massive pain control, and do not have allergic or drug effects (Burgess et al., 2020). Nonpharmacological methods are categorized into three components that interact with each other, hence, they influence the response to pain, which is motivational-effective strategies (the central interplay of messages residing in the brain affected by one's feelings, memory, experiences and culture), cognitive-evaluative (the central interplay of messages which are in contact influenced by knowledge, one's attention, the use of cognitive strategies, and cognitive evaluation of situations) and sensory-discriminatory (provision of tinkering information in accordance with physical sensations) (Cassaglia et al., 2020).

The intensity of pain during the first stage respondents before and after performing endorphin massage is generally different (Chakhtoura et al., 2019). It is followed the concept of the theory demonstrated that endorphin massage can inhibit the course of pain stimulation at higher center in the central nervous system (Yasar & Uysal, 2021). Furthermore, tactile stimuli and positive feelings developing when conducted forms of attention full of touch and empathy act in strengthening the effects of endorphin massage to control pain (Liao et al., 2021).

It was further elaborated with the concept that endorphin massage is physical contact providing a sense of comfort by stimulating the release of endorphin hormones which will corroborate balance energy and prevent disease (Liu et al., 2020). Physiologically stimulates and regulates the body, and enhances blood flow and lymph nodes, hence oxygen, food substances and food waste are effectively delivered the tissues of the body and the placenta by relaxing tension and supporting to lower emotions (Fasihi et al., 2022). Endorphin massage also calms the nerves as well as assists lower blood pressure (Meer et al., 2020).

In accordance with the study's results above, it is understood that the average intensity of pain during the first active phase of normal labor of multiparous mothers after breath relaxation is 5.40, with a standard deviation of 1.63. Meanwhile, the average pain intensity during the first active phase of normal labor of multiparous mothers after endorphin massage was 3.80, with a standard deviation of 1.08.

Result statistical tests employing the independent t-test obtained results ($p<0.05$) demonstrated that a p-value of 0.004 indicated a significant difference in the average pain intensity during the I active phase of normal childbirth of multiparous mothers in the breath relaxation group with the endorphin massage group.

Multiparous mothers have given birth to a baby several times (up to 5 times) (Nunez et al., 2016). Multiparous mothers had experienced pain in previous childbirth, thus, multiparous possesses a mechanism to overcome the pain of childbirth in contrast to primipara (Page et al., 2022). This mother had never given birth and had a child before, and the labor process she encountered was the first experience causing emotional tension, anxiety and fear that can aggravate the pain (Quinlan-Colwell et al., 2022).

At the time of the first stage, it was divided into 2 phases. The latent phase of a cervical opening lasts 7-8 hours until the opening of 3 cm, and the active phase of a cervical opening lasts 6 hours from the opening of 4 cm to 10 cm. At the time, the first stage of the maternal labor process was affected by power, passenger (fetus and placenta), passage (birth canal), and psychology (Sangeethalaxmi & Hankey, 2022). Psychology in childbirth encompasses fear and anxiety that can make the mother stressed. Stress in childbirth affects increased catecholamines (Adrenaline and non-adrenaline), which reduces uterine contractions and causes long partus and vasoconstriction of uterine blood vessels. Blood flow from the uterus to the placenta is decreased (Scuteri et al., 2022).

The relaxation of breath produces the maternity mother self-suspense during labor by regulating the breath coming out and enters through the nose slowly and regularly (Sorel et al., 2022). Furthermore, relaxation can also produce blood circulation in the uterus, placenta and fetus smooth, thus, oxygen and fetal food are fulfilled (Timmers et al., 2021). Smooth blood circulation will also create the muscles directly associated with the uterus which becomes weak and sagging, thus, the pain intensity can be reduced when the mother gives birth (Triansyah et al., 2021). This technique relieves pain and emotional stress during childbirth without using anesthetics (Urio et al., 2019).

Endorphin massage is physical contact that provides comfort by stimulating the release of endorphin hormones (Vilc et al., 2021). Endorphins are protein molecules produced by cells from the nervous system and some parts of the body which are beneficial for working together with sedative receptors to decrease pain encompassing 30 units of stress-relieving amino acids such as corticotropin, cortisol and catecholamines (Valente et al., 2020). This technique triggers a feeling of comfort through the surface of the skin (Sangeethalaxmi & Hankey, 2022). Endorphin massage for 20 minutes during labor helps the mother be comfortable and pain-free as it is able to stimulate the body to release endorphin compounds which are natural pain relievers and create a feeling of comfort and goodness (Scuteri et al., 2022). The effectiveness of this method generates stimulation to the brain smaller and slower than the extensive tactile fibers (Sorel et al., 2022). When touch and pain are stimulated together, the sensation of touch running to the brain closes the inner gate (Liao et al., 2021). The presence of endorphin massage, which possesses a distraction effect, can also escalate endorphins' formation in muscle relaxation (Fasihi et al., 2022).

Efforts to decrease the number of maternal pain during childbirth for multiparous mothers who experience pain before health workers should introduce breath relaxation techniques and endorphin massage in the community. Hence, multiparous mothers have the means to improve their knowledge of reducing pain during childbirth in a cheap, easy and effective way (Torkiyan et al., 2021).

4. CONCLUSION

It was concluded that there is an effect of breath relaxation on the intensity of pain during normal labor in multiparous mothers. There is an effect of endorphin massage on the intensity of pain during normal labor in multiparous mothers. There was a significant difference in the average intensity of pain during I normal labor between mothers who implemented the breath relaxation method and mothers who performed endorphin massage, with the average result of pain intensity during I normal labor after breathing relaxation being 5.40 with a standard deviation of 1.63. Meanwhile, the average pain intensity of multiparous mothers during the first stage of normal labor after the application of endorphin massage was 3.80, with a standard deviation of 1.08, a p-value of 0.004. Furthermore, researchers can do a combination of endorpine massage with other treatments to treat pain during the I active phase of labor and pain intensity checks can be done by testing cortisol levels.

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